



## Social media use and well-being: testing an integrated self-determination theory model

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### ABSTRACT

Although some commentators assert that social media use (SMU) has large negative effects on peoples' mental health, meta-analyses show the effect is tiny at best, implying that individual differences play an important role. We combined self-determination theory's organismic integration and basic psychological needs mini-theories to address this issue. Our integrated process model stated that self-determined motivation for SMU affects the extent peoples' relatedness needs are met during the activity, which in turn affects their subjective well-being (SWB). Cross-sectional study 1 found initial support for this model. Short-term longitudinal studies 2 and 3 assigned Ps to spend a few minutes on an enjoyable social media site (study 2) or on both an enjoyable and a less-enjoyable site (study 3), during the survey itself. In all three cases, self-determined motivation predicted relatedness need-satisfaction and enhanced SWB, after the experience. We conclude that, as with any behavior, peoples' motivation for SMU matters. Without considering this, blanket statements about SMU effects are likely to be misleading.

Recently, the question of how social media use (SMU) affects users' mental health and subjective well-being (SWB) has attracted considerable attention (Mir et al., 2022). Some commentators bemoan the rapidly increasing amounts of time people spend on social media, which necessarily crowds out time spent off-screen, in the “real world” (Twenge et al., 2018, 2019). They argue that this very large change in leisure time use, within just a single generation, explains the large increases in youth distress that have been seen over the same period, including increasing depression, loneliness, and suicidality (Twenge, 2020), and increasing obesity (Robinson et al., 2017), myopia (McCrann et al., 2020) and sleep problems (Twenge, 2020).

However, two co-occurring trends are not necessarily causally linked, and the research literature on SMU suggests a much more ambiguous and nuanced picture. In a meta-review of 14 meta-analyses, Meier and Reinecke (2020)

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concluded that the amount of SMU has a very small negative association with mental health, and that the effects are complex and dependent on many factors including the type and mode of SMU and the type of mental health indicator employed. They suggested that research should focus not just on time spent in SMU but also on why and how people use social media or on what contents they access. Similar conclusions were reached in reviews by Valkenburg (2021) and by Kaye et al. (2020), and both articles suggested that individual difference variables should be targeted to understand why people go on-line and what they gain there. Orben's (2020) review agreed with these suggestions and further advised researchers to conduct longitudinal studies, both short-term and longer-term, to better understand the dynamic processes at work.

In the current studies, we followed this advice by assessing individual differences in SMU motivations and in SMU-related need-satisfactions. We used these measures to predict peoples' SWB in general (in study 1) and after being experimentally assigned (in studies 2 and 3) to spend short periods of time on social media during the study. We hoped to show that the effect of SMU on peoples' SWB depends on two key factors: The autonomous quality of their motivation for using a site, and whether using the site satisfies their psychological needs (in particular, their relatedness need; Clark et al., 2018). Below we summarize relevant aspects of self-determination theory and review how SDT has been applied to SMU so far. Then, we present the integrated self-determination theory model that we tested and our associated research hypotheses.

### ***Self-determination theory***

Self-determination theory (SDT) is a macro theory of human motivation that purports to explain the motivational causes of wellness and thriving (Ryan & Deci, 2017). SDT contains five "mini-theories." In this research, we focused on two: the organismic integration theory (OIT) mini-theory and the basic psychological needs (BPN) mini-theory.

### ***Organismic integration theory***

OIT analyzes the reasons why people do things, locating those reasons on an underlying dimension ranging from very non-autonomous (or "controlled") motivations to very autonomous (or "self-determined") motivations (Sheldon et al., 2017). OIT is based on early intrinsic motivation research showing that peoples' spontaneous desire to do a behavior can be undermined by salient external rewards and pressures (Deci & Ryan, 1985; Deci, 1972). Participants who are paid to solve enjoyable puzzles lose their intrinsic motivation to do them voluntarily. Thus, in a subsequent "free choice" period, such participants are more likely to read magazines, rather than continuing to solve puzzles (Deci, 1972). Later, research found

intermediate motivations between the two extremes of intrinsic and external motivation, including identified motivation, a self-determined motivation in which one's behavior reflects one's internalized values, even if it is not enjoyable to do, and introjected motivation, a controlled motivation in which one forces oneself to do the behavior to avoid guilt or self-recriminations (Deci & Ryan, 1991; Ryan & Connell, 1989). Once assessed, these four motivations (external, introjected, identified, and intrinsic) can be evaluated separately, but usually, they are combined into a higher-order self-determined motivation composite.

OIT research typically finds that behaving for more self-determined reasons predicts better performance, more positive mood and greater satisfaction, at both at the trait (between-persons) and state (within-person) levels of analysis (Reis et al., 2000; Ryan & Deci, 2017; Sheldon, 2014). From the OIT point of view, it may not matter *what* one does, if one feels *autonomous* (i.e., volitional and choiceful) in doing it; in that case, the behavior will tend to benefit the individual. The OIT model is meant to apply to any behavior, including both things we seemingly “have” to do (i.e., work tasks, parenting, cleaning), and things we choose to do in our free time (i.e., playing sports, watching TV, or surfing social media). In either case, it is our attitude toward the behavior that determines its effect upon us.

Some SMU research already supports these ideas. For example, Manuoglu and Uysal (2020) measured self-determined motivation for four different categories of daily activity on Facebook, finding that self-determined SMU, summed across the four categories, was correlated with daily well-being, whereas the mere amount of time spent on Facebook that day was unrelated to daily well-being. In a study of instant messaging over a week-long period, Bauer et al. (2017) showed that daily well-being was affected by self-determined motivation to engage in such messaging on that day, especially if the person messaged in a mindful way.

The latter finding implies that there may often be extrinsic pressures to engage in SMU, which might have negative effects unless they are mitigated by mindfulness or by motivational factors. Supporting the extrinsic pressure idea, Hall (2017) found that feelings of entrapment while texting predicted lower SWB while texting and found that increasing entrapment over a week predicted reduced SWB at the end of that week. Halfmann and Rieger (2019) showed that social pressure for SMU (measured as external motivation) was associated with lower SWB and greater stress. These findings corroborate our presumption that controlled motivation for SMU is problematic. On the other hand, Reinecke et al. (2014) found that external motivations for SMU can sometimes produce positive experiences for participants. In the current research, we hoped to provide more information on how and when external motivation affects SWB.

### *Basic psychological needs theory*

The second SDT mini-theory we employed was basic psychological needs (BPN) theory. BPN asserts that all human beings have evolved a set of basic psychological needs, which are defined as distinct types of experience that promote health and well-being (Ryan & Deci, 2017; Sheldon, 2011). SDT focuses on the needs for autonomy, competence, and relatedness, although it does not deny that there may be other important needs not yet identified. To feel autonomous is to feel that one is doing what one chooses and is the cause of one's own behavior. Of course, autonomy need-satisfaction is conceptually related to self-determined motivation, but the need-satisfaction construct refers to the feelings that *result* from behavior, rather than motivations that *start* a behavior. To feel competent is to feel that one is behaving well and effectively while learning and mastering new skills. Felt competence is related to the classic constructs of effectance, self-efficacy, and mastery, and refers to feelings of accomplishment derived from behavior. To feel related is to feel meaningfully connected to others within one's life, both giving and receiving support from them.

BPN research has shown that all three needs independently predict a wide range of health, well-being, and functional outcomes (Reis et al., 2000; Ryan & Deci, 2017; Sheldon, 2011). In addition, experiencing need-satisfaction while doing a behavior tends to reinforce that behavior, helping to establish a habitual practice, such as in the case of video games (Martela & Sheldon, 2019; Rigby & Ryan, 2016).

Like OIT, BPN has also been applied within the SMU literature, within a variety of studies (Rigby & Ryan, 2016). For example, Karahanna et al. (2018) postulated that people engage in SMU to satisfy SDT needs, and that when they succeed, they are likely to experience SWB and to continue in their SMU. Li et al. (2020) showed that need-satisfaction during SMU predicts higher enjoyment and SWB in the SMU context, whereas need-frustration predicts lower enjoyment and SWB. Reinecke et al. (2014) reported that all three needs, when rated as being satisfied on Facebook, predict enjoyment of Facebook. Research also indicates that a person's off-line state of satisfaction affects their choices when they go on-line. Sheldon et al. (2011) showed that people go on Facebook when their off-line relatedness needs are thwarted; going on Facebook helps restore a feeling of interpersonal connectedness, within the social media context. Masur et al. (2014) found that thwarted autonomy and competence needs affect peoples' choices of which social media content to access, in ways that compensate for the absent satisfactions (see also Reinecke et al., 2012).

Which need, if any, is best satisfied by SMU? Clark et al. (2018) argued that social connection (aka, relatedness) is the primary need determining the positive (versus negative) effects of SMU – the final common reinforcer of SMU. In other words, to the extent that SMU emotionally connects users,

rather than isolating them, angering them, or entangling them in social comparisons, then SMU should be a positive experience. This proposal seems logical since social media, by design, are supposed to provide easy ways for people to communicate, interact, and connect with each other.

In the current research, we administered measures of all three SDT needs, to test our belief that relatedness satisfaction may be a particularly important reinforcer of SMU (Clark et al., 2018; Sheldon et al., 2011). Of course, other needs may also be affected in the process; SMU can provide users with opportunities to demonstrate prowess, claim triumphs, and solve problems (competence), and with opportunities to enact preferences, advance goals, and assert choice (autonomy). We hoped to provide new empirical information on these questions.

### ***An integrated SDT model***

So far, we have discussed the OIT and BPN SDT mini-theories and have reviewed SMU literature that has already applied one or the other theory. In this section, we combine the OI and BPN mini-theories into a single integrated sequence. According to the three-step model, the quality of one's motivation for doing a particular behavior affects the quality of the experiences one gets (i.e., whether one's needs are satisfied or not), which in turn affects one's enjoyment of the behavior and resultant SWB. This is a very common model in the SDT literature (Martela & Sheldon, 2019; Niemiec et al., 2009; Ryan & Deci, 2017), that is often applied regarding the goals or values that a person pursues over time (Sheldon, 2014). Such research finds that setting autonomous goals helps people to satisfy their *own* needs, rather than waiting for the environment to do it for them (Ryan & Deci, 2000). Need-satisfaction, in turn, predicts SWB at the end of the striving period (Sheldon & Elliot, 1999; Sheldon & Holberg, *in press*).

Despite its typical application to goal-striving, in principle, this integrated SDT model can be applied to any category of behavior that a person does (Martela & Sheldon, 2019) – not just striving for a goal, but also, going to work, going to the gym, taking out the trash, or using social media (Ryan & Deci, 2017). The advantage of the model is that it explains how a person's initial motivation to do X, whatever X is, affects the kinds of experiences they get while doing X, which in turn explains how they feel after doing X. Thus, the model shows how people can perhaps affect their own outcomes via their motivational attitudes, rather than having their outcomes determined by situational forces.

In the current research, we focused on SMU, expecting that our results would replicate the typical SDT findings. Thus, we viewed SMU as similar to other activities a person might do – in any case, motivation is what matters.

## **Summary and hypotheses**

Our first study hypothesis (H1) was that self-determined motivation for SMU would be positively associated with SWB, consistent with many past SDT studies. In study 1, we tested this with a cross-sectional design, and in studies 2 and 3 we tested it longitudinally, trying to predict the effects of short-term SMU upon short-term changes in SWB.

Our second hypothesis (H2) was that self-determined SMU would be associated with relatedness need-satisfaction, since social media are designed to connect people to each other, almost by definition (Clark et al., 2018; Sheldon et al., 2011). However, we also evaluated whether self-determined SMU predicts competence or autonomy need-satisfaction during SMU.

Our third hypothesis (H3) was that the link from self-determined motivation to SWB would be significantly mediated by relatedness need-satisfaction. Need-satisfaction often explains connections between motivated behavior and SWB (Martela & Sheldon, 2019). Evidence regarding mediation by specific needs is rarer, since the three needs tend to be highly correlated. The case of SMU seems apt for testing the unique effects of a specific need – in this case, relatedness (Clark et al., 2018).

## **Study 1**

### **Method**

#### **Participants and procedure**

Participants<sup>1</sup> were 200 students in a social psychology class at a large Midwestern university, 84 men and 116 women (the initial *N* was 205 but five participants were excluded because of missing data). They chose to take a paper-and-pencil survey on a particular day in class, in the fall of 2018, in exchange for extra credit. We conducted post-hoc power analyses using G\*Power to determine the archived power of analyses testing our main hypothesis. The power analysis showed that we had sufficient power (.98) to detect small-to-medium effects at a probability level of .05. Eighty-four percent of participants were Caucasian, and their median age was 20. Participants first rated their general well-being (SWB) and their general levels of need-satisfaction. Later in the survey, they wrote down three social media sites they use, and how much time they typically spend on each (because the paper surveys were inadvertently recycled in 2021, we are unable to report what sites were written down, a problem which is remedied in Studies 2 and 3). Participants then rated their typical motivations for SMU, and their typical feelings of need-satisfaction while on social media. We intended to use P's general SWB as the primary dependent measure. Of course, most college students spend much time on social media, of one type or another. Our

question was: how does a person's motivation for this important mode of time-use correlate with their general SWB in life?

### **Measures**

**Subjective well-being.** Participants first completed the brief mood scale used by Emmons (1991, 2022b, 2022a), rating “how you feel in general, in your life.” The scale consists of five positive mood items (e.g., happy, pleased) and four negative mood items (e.g., sad, frustrated); coefficient alphas were .86 and .84, respectively, for positive and negative mood. Participants also completed the two-item life-satisfaction scale of Brunstein (1993;  $\alpha = .70$ ), also regarding life in general. As in common practice (Diener, 1994), we computed an aggregate subjective well-being (SWB) variable by adding positive mood and life-satisfaction and subtracting negative mood (Diener, 1994; Sheldon & Elliot, 1999). For the reader's information, throughout these studies, analyses using positive affect, negative affect, and life-satisfaction separately, instead of aggregate SWB, provided essentially the same results (reversed for negative affect), although effects were somewhat weaker, on average, for these components of SWB. Analyses for these separate variables are reported in the OSF.

**Need-satisfaction in general.** Participants also completed the balanced measure of psychological needs (BMPN; Sheldon & Hilpert, 2012), by rating “how much each statement below relates to your life during the last month.” A 1 (strongly disagree) to 3 (neutral) to 5 (strongly agree) scale was employed. The BMPN contains six items per need, 18 in all. We computed general autonomy (“I am free to do things my own way”), competence (“I do well even at the hard things”), and relatedness (“I feel a sense of contact with people who care for me”) need-satisfaction scores from these ratings, after reverse-scoring negatively worded items. Coefficient alphas were .72, .63, and .67, respectively. We intended to use these measures as control variables in our analyses, such that SMU motivation would be predicting need-satisfaction during SMU, *relative* to the participant's general satisfaction, which was measured earlier in the study.

**Time on social media.** Participants indicated how much time every day they spend on each of the three media sites they listed. Because of the scantron format, we supplied a 1–5 scale regarding specific periods of time (<30 minutes, 30–60 minutes, 1–2 hours, 2–5 hours, and 5+ hours). Converted to minutes, sample means for the first, second, and third site listed were 106, 71, and 38 minutes. We summed these to derive a “daily time on social media” variable ( $M = 3$  hours and 45 minutes per day).

**Self-determined motivation for SMU.** Participants read “Why do you spend time on social media?” and made ratings using a 1 (not at all) to 5 (very much)



scale. We used the four items developed by Sheldon and Elliot (1999, 2017), which assess the four main motivations of the relative autonomy continuum (“because it is fun and interesting” (intrinsic), “because it is personally important and valuable to me” (identified), “because I would feel ashamed if I didn’t” (introjected), and “because important people will like me better, and reward me” (external)). We computed an aggregated relative autonomy index by adding intrinsic and identified and subtracting external and introjected motivations (Manuoğlu & Uysal, 2020). This often-used measurement procedure focuses on the difference between autonomous and controlled motivation, which is critical according to SDT (Ryan & Deci, 2017). After reverse-recoding introjected and external motivations and subtracting the mean motivation score from each item (as recommended by Sheldon et al., 2017), Cronbach’s alpha was .62.

*Need-satisfaction while on social media.* Participants read “how do you usually feel, while on social media?,” using the same response scale as above. We used the six items developed by Titova and Sheldon (2022b, 2022a), which consists of two adjective pairs per need (e.g., “lonely” versus “connected” is one such pair, measuring relatedness; “incompetent” versus “masterful” is another, measuring competence; and “pressured” versus “free” is another, measuring autonomy). Spearman-Brown reliability coefficients for these three variables were .76, .79, and .68, respectively.

Results

Table 1 contains descriptive statistics and correlations involving the major study variables, omitting the general need-satisfaction variables, which were used only as control variables. As can be seen, self-determined motivation for SMU was positively correlated with daily time spent on social media, supporting the idea that people tend to spend more of their free time doing things that feel self-determined. Time spent in SMU was associated with relatedness need-satisfaction on social media, consistent with our hypothesis that feelings of connectedness with others are a primary reward obtained on social media (Clark et al., 2018). Time spent on SMU was also correlated with autonomy need satisfaction on social media, but uncorrelated with competence

Table 1. Study 1: descriptive statistics for and correlations among major study variables.

|                              | Mean | SD   | Range     | 1     | 2     | 3     | 4     | 5     |
|------------------------------|------|------|-----------|-------|-------|-------|-------|-------|
| 1.Time on SM (daily minutes) | 215  | 139  | 15 to 900 |       |       |       |       |       |
| 2.Self-determined motivation | 3.07 | 2.13 | −3 to 8   | .22** |       |       |       |       |
| 3.General SWB                | 1.03 | 3.26 | −7 to 8   | −.06  | .21** |       |       |       |
| 4.Autonomy nsat on SM        | 3.26 | .99  | 1 to 5    | .22** | .45** | .18** |       |       |
| 5.Competence nsat on SM      | 3.18 | .83  | 1 to 5    | .12   | .42** | .20** | .59** |       |
| 6.Relatedness nsat on SM     | 3.41 | .83  | 1 to 5    | .21** | .47** | .33** | .45** | .61** |

SM = social media. nsat = need-satisfaction. \*\* =  $p \leq .01$ .



satisfaction and general SWB. Self-determined motivation for SMU had positive associations with the three social media need-satisfaction variables and with SWB. The three social media need-satisfaction variables were all significantly correlated with each other and with general SWB.

To test our main hypotheses, we constructed a regression equation using general SWB as the dependent variable. At step 1, we entered self-determined motivation for SMU while also entering daily time spent on social media as a control variable. At step 2, we entered the three social media need-satisfaction variables, to evaluate whether on-site relatedness need-satisfaction, in particular, can account for some of the motivation effects. At step 3, we entered the three general need-satisfaction variables. Does on-site relatedness need-satisfaction have associations with general SWB that go beyond the effects of general need-satisfaction? Such a finding would suggest that SMU is a significant life-strategy people that use, to satisfy their momentary needs (Rigby & Ryan, 2011).

At step 1, self-determined motivation was significant and positive ( $\beta = .24$ ,  $p = .001$ ). Time spent on social media was non-significant, with a beta coefficient of  $-.11$  ( $p = .11$ ). For the reader's information, supplemental analyses evaluating moderation of time spent on social media by motivation revealed no significant effects. Regression tables for all analyses in this article are provided in a supplemental file.

At step 2, relatedness need-satisfaction on social media was significant, with a  $\beta$  of  $.34$  ( $p < .001$ ). Betas for social media autonomy satisfaction and competence satisfaction were  $.06$  and  $-.06$  at this step, respectively,  $ps = .48$  and  $.58$ . Notably, self-determined motivation's beta coefficient decreased from  $.24$  to  $.08$  at this step ( $p = .30$ ), suggesting mediation by relatedness satisfaction (tested below).

At step 3, all three general need-satisfaction variables were significant, as is typical in such models. Most importantly, the coefficient for relatedness satisfaction derived from social media remained significant at this step ( $\beta = .29$ ,  $p < .001$ ). This suggests that on-site relatedness need-satisfaction may influence participants' general well-being independently of their general relatedness need-satisfaction. In other words, for participants with self-determined motivation for SMU, SMU may deliver a distinct socio-emotional benefit relevant to their overall well-being. See the OSF for a complete table of this analysis and for the three components of SWB.

Next, we conducted a mediation analysis to investigate the mediating role of relatedness need satisfaction, derived from SMU, between self-determined motivation and SWB. Specifically, we used a bootstrapping procedure through the PROCESS macro for SPSS with 5000 bootstrap samples (model 4; Hayes, 2013). The predictor variable was self-determined motivation, the mediator that was tested was relatedness need satisfaction from SMU, and the dependent variable was SWB. We also included the three general need-satisfaction

variables as covariates. This model showed mediation of the self-determined motivation effect on SWB via relatedness, as suggested by the significant indirect effect ( $b = .15$ ,  $[.05, .27]$ ) and the non-significant direct effect ( $b = .03$ ,  $p = .810$ ,  $[-.18, .23]$ ). See the OSF for details.

### **Brief discussion**

Study 1 provided preliminary support for our research hypotheses, by examining participants' general motivations for SMU as predictors of their typical need-satisfaction during SMU, and their general SWB. We found that self-determined SMU was associated with general SWB (H1). Self-determined SMU was also associated with relatedness need-satisfaction while on social media (H2). This relationship partially mediated the link between self-determined SMU and general SWB (H3). Also, these results also held when controlling for participants' general levels of need-satisfaction. This means that site-specific need-satisfaction is not the same as general need-satisfaction; site-specific need-satisfaction supplies unique predictive variance regarding general SWB that goes beyond general need-satisfaction.

## **Study 2**

In Study 2 we moved beyond surveying peoples' *general* social media practices, motivations, and experiences. Instead, we wished to examine the *transient* effects of social media use, as prompted during the study itself. We asked participants to leave the on-line survey mid-stream, to spend 10 minutes on a social media site of their choosing. Then, they returned to the survey. By assessing Ps' need-satisfaction and SWB *after* that 10-minute period, compared to these same variables as measured at the beginning of the study, we could evaluate the momentary effects of SMU upon them.

### **Method**

#### **Participants, procedure, and measures**

Participants were 396 introductory psychology students at a large Midwestern university, 175 males and 221 females. Eighty-three percent were Caucasian, and the median age was 19. They completed the online survey in exchange for required research credit. There was no target  $N$ , as we included all willing participants. We conducted post-hoc power analyses using G\*Power to determine the archived power of analyses testing our main hypothesis. The power analysis showed that we had sufficient power (.99) to detect small-to-medium effects at a probability level of .05. Data collection ceased naturally at the end of the semester.

The survey first assessed participants' general SWB, using the same nine-item mood scale and two-item life-satisfaction scale as in Study 1, but with 7-point instead of 5-point scales. We computed an aggregate SWB score from these ratings, just as before ( $\alpha = .92$ ). We also assessed participants' general need-satisfaction, this time using the 6-item scale that was used in Study 1 to assess need-satisfaction on social media (in this case, it was administered with generic instructions). General autonomy, competence, and relatedness need-satisfaction scores were computed, in the same way as Study 1 ( $\alpha$ s = .84, .83, and .70, respectively). These SWB and need-satisfaction variables served as our baseline measures, against which to evaluate the effects of transient SMU.

We then asked participants "What is the social media site/app that you would most like to use, right now? That is, if you could take a break from this survey and do something else on-line right now, what would you do?" They then typed in a choice. One hundred and fifty-five participants listed Snapchat, 122 participants listed Instagram, and 82 participants listed Twitter. Thirty-seven participants entered some other site like Facebook, YouTube, or Reddit.

Next, participants read "Now, we want you to actually GO to that site, and spend 10 minutes USING this app/site, just like you normally would. Please just use the app/site like you normally do until the timer is up. You might as well do it, because you won't be able to advance to the next part of the survey until 10 minutes have passed." Indeed, there was a timer which prevented forward motion until 10 minutes had passed. Thus, we assume that participants followed the instructions, although we had no way to confirm this.

After the 10 minutes were up, participants were asked "how did you feel, a few minutes ago, when you were on the site?" They then completed the same motivation items used in Study 1, reworded to ask "why you were using the site just now." They also completed the need-satisfaction scale again, from which we computed autonomy, competence, and relatedness satisfaction scores "on-site." (Spearman-Brown ( $\alpha$ s = .80, .86, and .87, respectively)). Next, they completed the 9-item mood scale again, this time with reference to "how you felt while on the site." Both scales employed 7-point scales. We also asked them to rate their sense of life-satisfaction while on the site, using a 7-point scale ranging from not at all satisfied to very satisfied. We computed a "SWB on-site" variable in the same manner as in Study 1, by adding positive affect and life-satisfaction and subtracting negative affect (Diener, 1994;  $\alpha = .89$ ). In addition, we asked participants "*why* did you choose to spend time on that site?," using the same motivation items as before, from which we again computed a relative autonomy index to represent self-determined motivation ( $\alpha = .76$ ).

## Results

Table 2 contains descriptive statistics and correlations for the major study variables, omitting control variables. As can be seen, self-determined

**Table 2.** Study 2: descriptive statistics for and correlations among major study variables.

|                              | Mean | SD   | Range      | 1     | 2     | 3     | 4     | 5     |
|------------------------------|------|------|------------|-------|-------|-------|-------|-------|
| 1.General SWB                | 6.70 | 3.28 | –5 to 13   |       |       |       |       |       |
| 2.Self-determined motivation | 5.92 | 4.35 | –10 to 16  | .19** |       |       |       |       |
| 3.SWB on-site                | 8.50 | 3.04 | –2.6 to 14 | .49** | .50** |       |       |       |
| 4.Autonomy nsat on on-site   | 5.14 | 1.39 | 1 to 7     | .21** | .31** | .44** |       |       |
| 5.Competence nsat on-site    | 4.67 | 1.25 | 1 to 7     | .25** | .20*  | .45** | .62** |       |
| 6.Relatedness nsat on-site   | 5.00 | 1.29 | 1 to 7     | .32** | .26** | .53** | .55** | .72** |

nsat = need-satisfaction. mot = motivation. \* =  $p \leq .05$ . \*\* =  $p \leq .01$ .

motivation again had positive significant correlations with the three on-site need-satisfaction variables and with on-site SWB. The three on-site need-satisfaction variables were all significantly intercorrelated and were all positively correlated with on-site SWB.

To test our main hypotheses, we constructed a regression equation as in Study 1, this time using on-site SWB, rather than general SWB, as the dependent variable. At step 1, we entered on-site self-determined motivation. At step 2, we entered general SWB, to establish that on-site motivation affects momentary SWB relative to SWB measured at the beginning of the survey. At step 3, we entered the three on-site need-satisfaction variables, to evaluate whether relatedness need satisfaction can account for some of the motivation effects upon on-site SWB. At step 4, we entered the three general need-satisfaction variables, to evaluate whether on-site relatedness need-satisfaction has effects upon on-site SWB beyond the effects of general need-satisfaction. This would support our assumption that transient SMU has effects on participants' feelings of satisfaction that cannot be explained as due to their general need-satisfaction.

At step 1, on-site self-determined motivation was a significant and positive predictor of on-site SWB ( $\beta = .50$ ,  $p = .001$ ). At step 2, general SWB was significant ( $\beta = .41$ ,  $p < .001$ ) and self-determined motivation remained significant ( $\beta = .42$ ,  $p < .001$ ). This shows that SMU changed peoples' momentary SWB, depending on their motivation. At step 3, of the three on-site need-satisfaction variables entered, only relatedness satisfaction on-site was significant, at  $\beta = .24$  ( $p < .001$ ); the beta coefficients for autonomy and competence satisfaction were .10 and .07 at this step ( $ps = .04$  and .20, respectively). This shows that on-site relatedness need-satisfaction was most important for on-site SWB, as hypothesized. The beta coefficient for self-determined motivation was reduced from .42 to .34 ( $p < .001$ ) at this third step, suggesting partial mediation by relatedness satisfaction. At step 4 none of the general need-satisfaction variables predicted on-site SWB, and the step 3 coefficients were essentially unchanged. This solidifies the claim that transient SMU had effects upon peoples' momentary psychological state. As in study 1, a complete table from this analysis, and tables for the separate components of the SWB variables, can be found in the supplemental file.

Next, we again formally tested mediation from self-determined SMU to on-site SWB through relatedness need satisfaction during SMU, using a bootstrapping procedure with 5000 bootstrap samples. The model was the same as in Study 1, with self-determined motivation serving as a predictor, relatedness need-satisfaction on-site as a mediator, and SWB on-site as the dependent variable. We also again included the three general need-satisfaction variables as covariates. This time, mediation by relatedness need-satisfaction was partial but, as suggested by both indirect ( $b = .05$ , [.03, .09]) and direct effects ( $b = .26$ ,  $p < .001$ , [.20, .31]) was significant. See the OSF for details.

### **Brief discussion**

Study 2 again supported our study hypotheses and the integrated SDT model, this time in the context of a 10-minute period of social media use that took place during the study. Self-determined motivation for SMU predicted changes in SWB after the 10-minute period (H1) and predicted relatedness need-satisfaction felt while on the site (H2). Once again, relatedness need-satisfaction mediated the effect of motivation upon SWB (H3). Importantly, these effects held even after controlling for general SWB and for general need-satisfaction, as measured at the beginning of the study. This pre-post/posttest design permits the inference that going onto the site changed participants' momentary mood, relative to what they started with.

### **Study 3**

An important limitation of Study 2 was that participants identified the social media site that they would “most like to use, right now.” If SMU sometimes has negative effects, this may not be the right way to find them. What about the (perhaps all too frequent) cases where we feel we must go to a site we do not like using? Thus, in Study 3 we tested our hypotheses in a more differentiated way, by asking participants to list *two* social media sites they use: One that they like and enjoy (corresponding to self-determined motivation), and another that they do not really like that much (corresponding to controlled motivation). This allowed us to directly manipulate our focal variable, self-determined motivation for SMU, across two different experiences (a  $1 \times 2$  design with repeated measures on the second factor). Then, we asked participants to spend 5 minutes on each site, in a counter-balanced sequence. We assessed their motivations and experiences after each of the two episodes.

Our hypotheses remained the same: that self-determined SMU predicts on-site SWB (H1) and relatedness need-satisfaction (H2), mediating to on-site SWB (H3). Here, however, we were able to test the hypotheses twice – once in the context of an enjoyable site, and once in the context of a less-enjoyable site. We thought the same dynamics should apply in either case, because more self-

determined SMU is better than less, even within a less enjoyable context, overall. As a third way of testing the hypotheses, we also planned to conduct within-subjects comparisons of the two episodes. We expected participants to differ in their reported motivation on the two sites and expected these differences to affect their reported relatedness need-satisfaction while on a particular site. This test, based on mean differences rather than correlations, would support our hypotheses in an independent way.

## **Method**

### ***Participants, procedure, and measures***

Participants were 147 introductory psychology students at a large Midwestern university, 80 males and 66 females (one missing gender data). Eighty-two percent were Caucasian, and the median age was again 19. They completed the on-line survey in exchange for required research credit. Data collection began late in the semester and was naturally terminated at the end of the semester. We conducted post-hoc power analyses using G\*Power to determine the archived power of analyses testing our main hypothesis. The power analysis showed that we had sufficient power (.92) to detect small-to-medium effects at a probability level of .05.

The survey first assessed participants' general SWB, using the same 9-item mood scale and 2-item life-satisfaction scale as in Studies 1 and 2, administered via a 7-point response scale. We computed an aggregate SWB score from these ratings, via the same formula as before, for use as a baseline control variable ( $\alpha = .87$ ). We also assessed participants' general need-satisfaction, again using the scale employed in Study 2. General autonomy, competence, and relatedness need-satisfaction scores were computed, again for use as baseline control variables ( $\alpha$ s = .78, .83, and .87, respectively).

Participants next read "People use a variety of social media services, for a variety of reasons. Please think of a particular site or app that you sometimes go to, that you like and enjoy! For example, you might go to this site because it is a place to share fun experiences with friends, or a place to share songs or images with friends. Or, you might go to this site because you learn interesting new things there." These instructions were intended to induce participants to visit a site that they are autonomously motivated to visit. Participants typed the name of a site into a text box and indicated how much time they spend on it in a typical day, using the same item used in the earlier studies. The mean was 106 minutes.

Then, participants read "Now, please think of a particular site or app that you sometimes go to, that you don't really like that much. For example, you might go to this site only because an organization or club you belong to uses it, and you need to get information there. Or, you might go to this site mainly to keep tabs on what others are doing, or so you won't feel left out of things." This

manipulation was intended to induce participants to visit a site that they likely have controlled motivation to visit, as in “having” to go there, because of a group or because of fear of missing out.

After typing in the name of a site, they rated how much time they spend on it per day. The mean was 49 minutes, significantly less than the time typically spent on the “enjoyable” site ( $t(147) = 8.22, p < .001$ ).

Next, participants read: “Now, we want you to actually GO to (the name of one or the other site was piped into the survey, in counter-balanced order), and spend 5 minutes USING this app/site, just like you normally would. Please just use the app/site like you normally do until the timer is up.” A timer indeed indicated when the time was up. Afterward, participants rated their on-site self-determined motivation, with respect to why they had just spent the 5 minutes on the site. They also rated their on-site need-satisfaction and positive and negative mood, using the same items as in previous studies. On-site life satisfaction was not assessed in Study 3 and thus was not included in the SWB composite.

Then, they were asked to go to the second site, with the same instructions. After spending 5 minutes on the second site, they again rated their on-site motivation, need-satisfaction, and SWB (for the enjoyable site,  $\alpha = .73, .70, .8385$ , and  $.89$ , respectively; for the non-enjoyable site,  $\alpha = .61, .85, .82, .81$ , and  $.91$ , respectively).

For the reader’s information, we examined the activity frequencies for the enjoyable and non-enjoyable sites. For the enjoyable site, the most frequent was Twitter (56), followed by Instagram (51), Snapchat (20), and Facebook (8); 13 were “other.” For the non-enjoyable site, the most frequently used was Instagram (42), followed by Twitter and Facebook (both with 38), followed by Snapchat (17). It is intriguing that Facebook was listed much more often for the non-enjoyable than for the enjoyable site.

## Results

Tables 3 and 4 contain descriptive statistics and correlations for the primary variables, regarding the enjoyable and non-enjoyable site, respectively. On the enjoyable site, self-determined motivation was significantly positively correlated with SWB on-site and with autonomy need-satisfaction on-site. On the non-enjoyable site, self-determined motivation had significant positive correlations with on-site SWB and with all three on-site need-satisfaction variables. In both tables, the three on-site need-satisfaction variables were significantly intercorrelated and were all correlated with on-site SWB (again as usual).

To test our main hypotheses, we constructed two regression equations, one for the enjoyable site and one for the non-enjoyable site, predicting the relevant on-site SWB variable. Once again, we entered self-determined motivation at step 1 to account for participant motivation; general SWB at step 2 to



**Table 3.** Study 3: enjoyable site: descriptive statistics and correlations among major study variables.

|                              | Mean | SD   | Range   | 1     | 2     | 3     | 4     | 5     |
|------------------------------|------|------|---------|-------|-------|-------|-------|-------|
| 1.General SWB                | 1.45 | 2.14 | –5 to 6 |       |       |       |       |       |
| 2.Self-determined motivation | 1.92 | 1.68 | –3 to 6 | .04   |       |       |       |       |
| 3. SWB on-site               | 2.83 | 2.01 | –3 to 6 | .58** | .31** |       |       |       |
| 4.Autonomy nsat on on-site   | 4.86 | 1.40 | 1 to 7  | .31** | .30** | .37** |       |       |
| 5.Competence nsat on-site    | 4.45 | 1.23 | 1 to 7  | .46** | .14   | .38** | .60** |       |
| 6.Relatedness nsat on-site   | 4.86 | 1.14 | 1 to 7  | .46** | .16   | .46** | .60** | .70** |

nsat = need-satisfaction. \*\* =  $p < .01$ .

**Table 4.** Study 3: non-enjoyable site: descriptive statistics and correlations among major study variables.

|                              | Mean | SD   | Range   | 1     | 2     | 3     | 4     | 5     |
|------------------------------|------|------|---------|-------|-------|-------|-------|-------|
| 1.General SWB                | 1.45 | 2.14 | –5 to 6 |       |       |       |       |       |
| 2.Self-determined motivation | .82  | 1.48 | –5 to 5 | –.02  |       |       |       |       |
| 3.SWB on-site                | 1.64 | 2.35 | –6 to 6 | .37** | .28** |       |       |       |
| 4.Autonomy nsat on on-site   | 4.31 | 1.34 | 1 to 7  | .14   | .22** | .41** |       |       |
| 5.Competence nsat on-site    | 4.16 | 1.19 | 1 to 7  | .27*  | .06   | .29** | .64** |       |
| 6.Relatedness nsat on-site   | 4.25 | 1.41 | 1 to 7  | .29** | .18*  | .50** | .66** | .66** |

nsat = need-satisfaction. \* =  $p < .05$ . \*\* =  $p < .01$ .

account for baseline SWB; the three on-site need-satisfaction variables at step 3 to account for the experience of the site; and the three general need-satisfaction variables at step 4 to account for the possible effects of baseline need-satisfaction.

### *Enjoyable site*

At step 1, on-site self-determined motivation was significant and positive ( $\beta = .31$ ,  $p < .001$ ). At step 2, general SWB was significant ( $\beta = .57$ ,  $p < .001$ ) and the motivation coefficient was slightly reduced ( $\beta = .28$ ). This shows that self-determined motivation for SMU during this episode predicted boosted SWB above the initial baseline. At step 3, relatedness need-satisfaction on-site was significant at  $\beta = .20$ ,  $p = .03$ ; neither autonomy nor competence satisfaction on-site reached significance. As before, at step 4 none of the general need-satisfaction variables predicted on-site SWB, and the step 3 on-site need-satisfaction coefficients were essentially unchanged. As in the earlier studies, the results from this analysis and the analyses below are tabled in the supplemental file as are the results for positive affect and negative affect separately.

### *Non-enjoyable site*

At step 1, on-site self-determined motivation was significant and positive ( $\beta = .28$ ,  $p < .001$ ). At step 2, general SWB was significant ( $\beta = .37$ ,  $p < .001$ ) and the motivation coefficient was essentially unchanged ( $\beta = .30$ ), again showing that self-determined SMU boosts well-being over baseline. As hypothesized, at step 3, on-site relatedness need-satisfaction was significant ( $\beta = .37$ ,  $p < .001$ ). Neither autonomy nor competence need satisfaction was

significant at this step. In this step, the on-site self-determined motivation coefficient dropped from .28 to .20 ( $p < .01$ ), indicating partial mediation. At step 4 only general competence need-satisfaction was significant ( $\beta = .22$ ,  $p = .03$ ) and the on-site need-satisfaction coefficients from step 3 were essentially unchanged.

### *Mediation analyses*

Again, we ran mediation analyses to assess if relatedness need satisfaction acted as a mediator, using the bootstrapping procedure with 5000 bootstrap samples. Self-determined motivation was a predictor, relatedness need satisfaction from SMU was the mediator, and SWB on-site was the dependent variable.

For the enjoyable site, we did not find significant mediation, as the direct effect was significant at  $b = .29$ ,  $p < .001$ ,  $[.12, .46]$ , but the indirect effect was not ( $b = .03$ ,  $[-.01, .09]$ ). However, we did find partial mediation for the non-enjoyable site, with both the direct effect ( $b = .32$ ,  $p = .006$ ,  $[.09, .54]$ ) and the indirect effect ( $b = .13$ ,  $[.01, .28]$ ) being significant. See the OSF for details.

### *Comparing the two episodes*

Finally, we examined condition differences. Five paired t-tests compared on-site motivation, SWB, and autonomy, competence, and relatedness need-satisfaction, across the enjoyable and non-enjoyable conditions. Significant differences emerged in all five analyses, in which the positive outcomes were higher in the enjoyable condition (all  $t$ s  $> 2.88$ , all  $p$ s  $< .005$ ; the means can be found in [Tables 3 and 4](#)). Notably, the observed self-determined motivation difference between the two conditions serves as a manipulation check regarding the two within-subject conditions.

To evaluate possible mediational effects we used ANCOVA (Valente & Mackinnon, 2017). First, we compared the two SWB measures via ANOVA, finding a significant difference ( $(F(1,146) = 39.04, p < .001)$ ). Second, we conducted an ANCOVA in which we controlled for the two self-determined motivation measures. This substantially reduced the SWB difference ( $(F(1,145) = 11.37, p < .001)$ ). Third, we conducted an ANCOVA in which we controlled for the two relatedness need-satisfaction variables in addition to the two self-determined motivation variables. This further reduced the SWB difference ( $(F(1,144) = 4.43, p = .037)$ ), and helped to explain the motivation effects on SWB. In contrast, when we controlled for the two autonomy need-satisfaction variables, the SWB difference was only reduced to  $F(1,144) = 8.18, p < .001$ ). Also, when we controlled for the two competence need-satisfaction variables, the SWB difference was only reduced to  $F(1,144) = 9.91, p < .001$ ).

### **Brief discussion**

Study 3 replicated most but not all the earlier patterns. First, on both the enjoyable and non-enjoyable sites, self-determined SMU predicted site-specific SWB, beyond general SWB (H1), and predicted site-specific relatedness need-satisfaction (H2). Also, on-site relatedness need-satisfaction was a mediational factor in the non-enjoyable site. These findings help support our integrated process model, based on SDT. Turning to the within-subjects comparison, being on the non-enjoyable site was rated as evoking less self-determined motivation, and as being less rewarding and conducive to SWB, compared to being on the enjoyable site. The latter analyses establish the associations between self-determined SMU, relatedness need-satisfaction, and SWB in a different and independent way.

### **General discussion**

In this research, we attempted to understand the effects of SMU upon users by testing an integrated self-determination theory model. We assumed that SMU is like many other behaviors studied by SDT researchers, such as playing sports, attending school, participating in a group, or doing chores. Typically, the effect of doing a behavior upon a person depends on “why” they do it, i.e., on the self-determined quality of their motivation for the activity (Ryan & Deci, 2017). That is, do they enjoy and identify with doing it, or do they feel pressured to do it, internally or externally (Halfmann & Rieger, 2019; Hall, 2017)?

Study 1 found that self-determined motivation for SMU was positively associated with peoples’ general SWB. The mere amount of time spent on SMU was unrelated to SWB. Study 1 also found that self-determined SMU is associated with relatedness need-satisfaction while on social media (H2), which in turn helps explain the relationship of self-determined motivation with general SWB (H3). Of course, this was a very weak test of the model because of the cross-sectional methodology. Still, it suggests that SMU is a consequential activity in students’ lives. After all, they spend almost 4 hours a day in SMU, which our data suggest is a sufficient length of time to affect their general SWB.

Study 2 introduced an experiential methodology. Whereas many past studies have tested the effects of being assigned to *abstain* from SMU for a short period of time (Sheldon et al., 2011), fewer studies have tested the effects of being assigned to *engage* in SMU during a short period of time. Study 2 showed that self-determined motivation for SMU during the 10-minute period predicted felt SWB (H1) and relatedness need-satisfaction (H2) during that period, and that relatedness need-satisfaction partially mediated the H1 effect (H3). The significant effects remained when general SWB and general need-

satisfaction were partialled out of the equation, meaning that self-determined motivation predicted *changes* in satisfaction and SWB, relative to the participant's initial baseline.

Study 3 was a repetition of Study 2, this time with two assigned periods of SMU, not just one, corresponding to a “site you enjoy using” and “a site you use but don't like that much.” The point of Study 3 was to show that the integrated SDT model applies regardless of whether the social media site is subjectively judged as being enjoyable or non-enjoyable. As expected, self-determined motivation mattered equally on both sites; the more the participant wanted to be on the site, compared to other participants, the more SWB they got out of it.

Together, these results indicate, once again, that the “why” of motivation matters. Still, we do not mean to trivialize the “what” of motivation, i.e., the content or target of the behavior. Research indicates that “what” people do can also make a difference (for example, whether the goal targets intrinsic versus extrinsic values; extrinsic values like popularity, image, and luxury are less beneficial for SWB than intrinsic values like growth, connection, and service; Ryan & Deci, 2000). Typically, the “why” and “what” of behavior have independent main effects on outcomes (Sheldon et al., 2004), and we would expect the same with SMU. We did address this issue in Study 3, by comparing the enjoyable and the non-enjoyable sites. The within-subject differences we observed, offering a different kind of support for our SDT model, indicate that “what” the participant does on-line matters.

However, one limitation of our research is that we did not compare SMU to some other transient activity altogether, like watching T.V. or taking a walk. Commentators bemoaning the negative effects of SMU upon society assume that SMU is “worse” than many other things the person could be doing (Twenge, 2020), and our data cannot disprove that conjecture. Still, it is hard to imagine why people would spend nearly 4 hours a day in SMU, if they did not find it rewarding in at least some, if not many, ways. In conclusion, it seems premature to assert that SMU is a terrible way to spend time.

Additional study limitations include the fact that participants were assigned to go to a social media site, during a research study. This may have been an unusual or artificial experience, within the context of taking a survey. Experience-sampling data of natural SMU would help address this limitation, by evaluating the effects of freely chosen SMU upon peoples' state of mind. Another limitation was the very short periods of time involved (one 10-minute episode in Study 2 and two 5-minute episodes in Study 3). Although these periods were long enough to demonstrate the predicted effects, it is unclear whether the effects would generalize to longer periods of assigned engagement, such as an hour or 2 hours. We would expect that longer periods would remain beneficial, perhaps up to some limit, if the person has self-determined motivation for engagement – in the same way that a person might spend 8 hours running an ultra-marathon or

spend the day sailing a boat and feel very good afterward. We would also expect that even very short-term effects can cumulate, over time and with repetition, to longer effects. When short-term activities are satisfying, they are likely to be repeated and lengthened in scope. Another limitation comes from the relatively weak alpha coefficients observed for some of the short scales employed. A final limitation concerns the college student samples, taken from one university in the U.S. Midwest. As always, it would be beneficial to generalize the findings to people within other cohorts and nationalities.

Still, our main finding is relatively simple and straightforward, with a clear prescription: in your free-choice activities, be sure to do what you want to do! Just as is usually shown by SDT research, it matters *why* we do things; if we are doing what is enjoyable and meaningful, there is generally no problem. Still, our results suggest that some people *do* engage in SMU due to more controlled motivations (Halfmann & Rieger, 2019; Hall, 2017). Thus, it may not always be easy to know what one wants to do, or to avoid doing things one does not want to do (Sheldon & Elliot, 1999), even if they are (ostensibly) recreational activities. Arguably, overcoming these problems is a critical task for people, for learning to live satisfying and fulfilling lives (Martela & Sheldon, 2019). At least, our results suggest that “mere time spent on social media” (or in the digital world more generally) is not the bogeyman some claim it to be. More nuance is required, to understand the effects of peoples’ self-chosen SMU upon their well-being.

## Note

1. Study data and supplemental regression tables can be found in the OSF at [https://osf.io/5rjwf/?view\\_only=d9ef3c0c509a4457a9e3e6679e3fa6dd](https://osf.io/5rjwf/?view_only=d9ef3c0c509a4457a9e3e6679e3fa6dd).

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## Disclosure statement

No potential conflict of interest was reported by the author(s).

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